

RIFA Workshop  
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California Department of Pesticide Regulation  
[www.cdpr.ca.gov](http://www.cdpr.ca.gov)

## **Mitigating Insecticide Runoff from RIFA Insecticide Treatments**

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### ***Environmental Hazards***

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“This pesticide is extremely toxic  
to fish and aquatic invertebrates.”

### ***Outline***

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- Introduction
- Insecticide Characteristics
- Environmental Factors
- Field Management Practices
- Prevention and Mitigation Measures
- Summary

### *Introduction*

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- RIFA treatments – wide area
- Surface water runoff potential
- Historical monitoring data
- Aquatic toxicity
- Runoff prevention and mitigation

### *Monitoring Program*

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- Insecticide Concentration
  - Offsite movement
- Dissipation study
  - Turf, Soil, Water
- Assessing Mitigations

### *Offsite Movements*

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- Drift
  - primary, secondary
- Runoff
  - dissolved in water
  - adsorbed to soil particles and organic materials

### *The Insecticides*

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- Bifenthrin (Talstar®)
- Chlorpyrifos (Dursban®, Lorsban®)
- Diazinon
- Fenoxycarb (Award®)
- Hydramethylnon (Amdro®)
- Pyriproxyfen (Distance®)

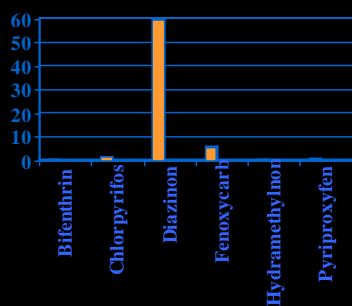
### *Insecticide Characteristics*

- Vapor Pressure (mm Hg)
- Water Solubility (ppm, mg/L)
- Soil Adsorption Coefficient (Koc)
- Field Dissipation ( $t_{1/2}$ , days)

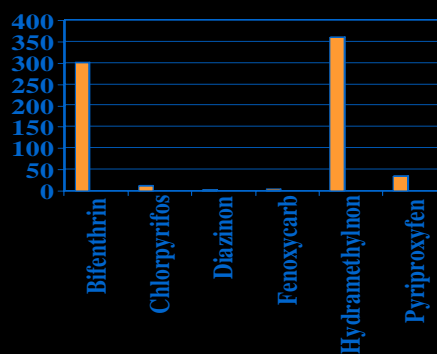
### *Physico-Chemical Properties*

Pesticide	Sol.	Koc	FD
Bifenthrin	0.1	302,000	345
Chlorpyrifos	1.4	12,000	56
Diazinon	60	1,800	30
Fenoxycarb	5.7	2,600	36
Hydramethylnon	0.9	360,000	55
Pyriproxyfen	0.4	34,000	86

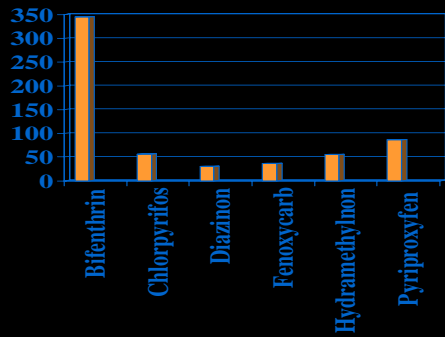
### *Water Solubility (ppm)*



### *Soil Adsorption Coefficient ( $\times 1000$ )*



### Field Dissipation Half-Life (Days)

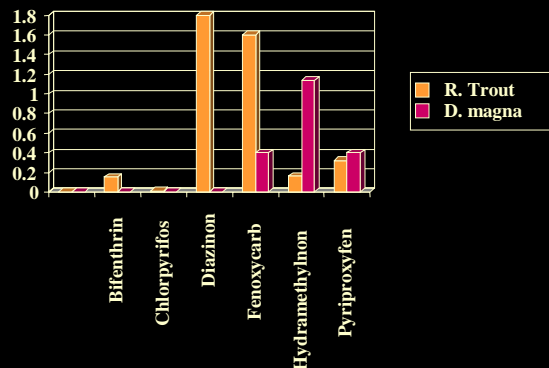


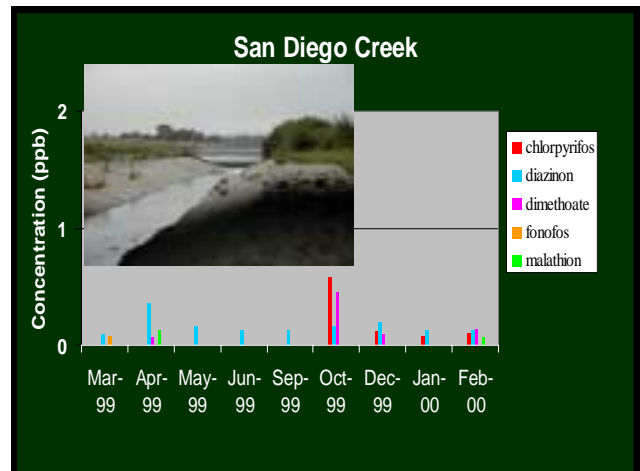
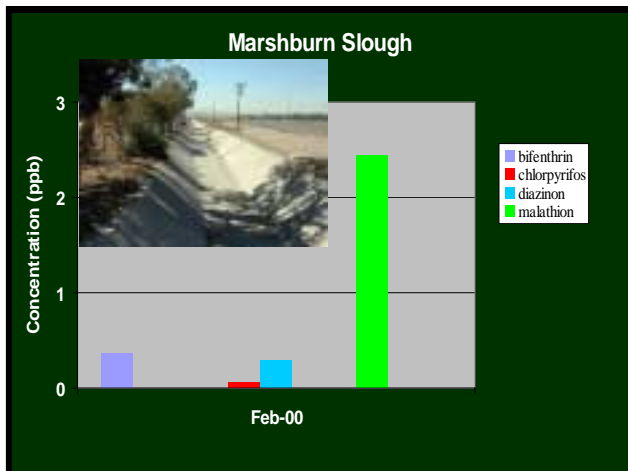
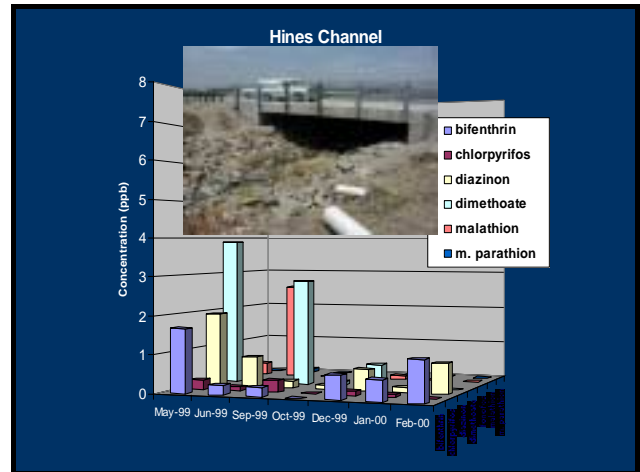
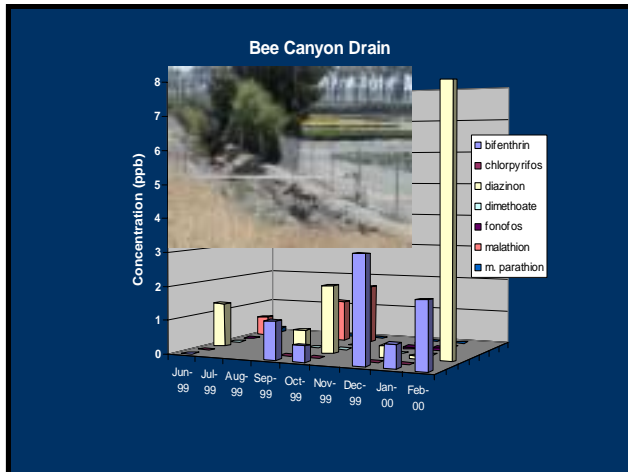
### Aquatic Toxicity ( $LC_{50}$ )

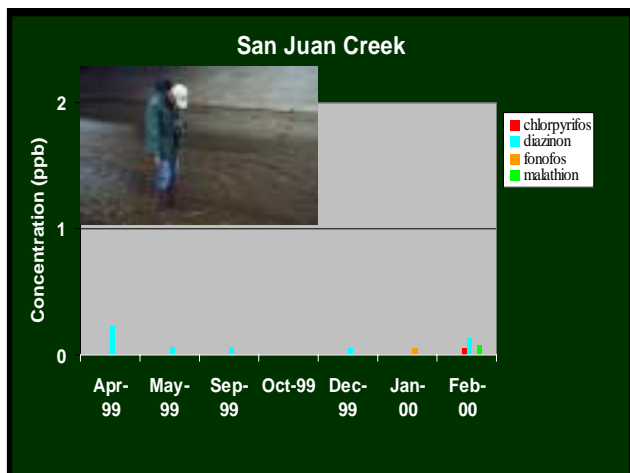
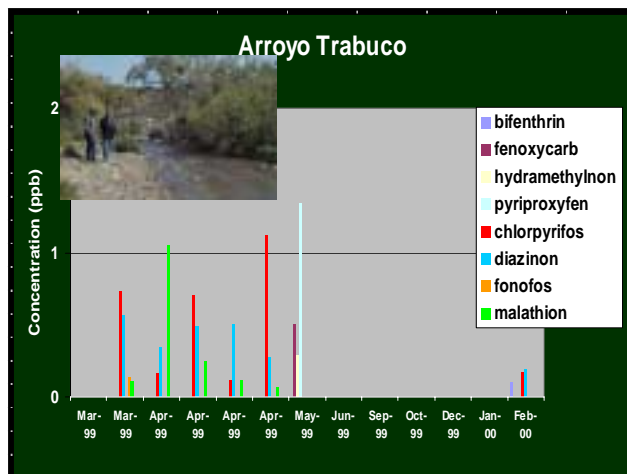
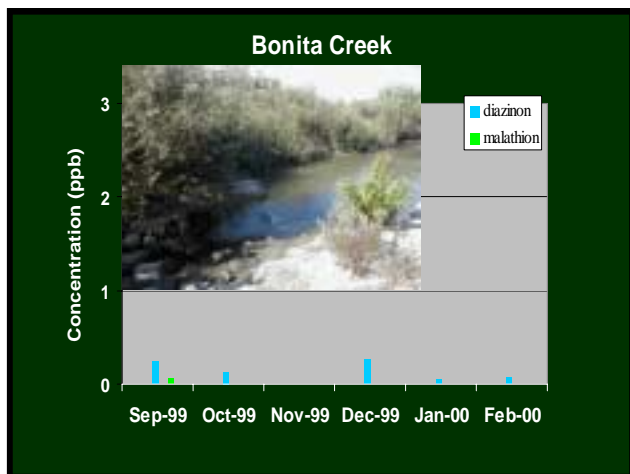


Pesticide	R. Trout (ppb)	D. Magna (ppb)
Bifenthrin	0.15	0.16
Chlorpyrifos	3	1.7
Diazinon	2600	0.96
Fenoxycarb	1600	400
Hydramethylnon	160	1140
Pyriproxyfen	325	400

### Aquatic Toxicity







## *Climatic Conditions*

- Rainfall
  - duration, amount, and intensity
  - timing of rainfall after application
  - time to runoff after inception of rainfall

### *Soil Characteristics*

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- Texture
- Organic matter content
- Moisture content
- Surface compaction and crusting
- Slope
- Aggregation

### *Field Management Practices*

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- Pesticide placement
  - soil, foliar applied, potting mix
- Erosion/runoff control
- Cropping patterns
- Irrigation management
  - duration, amount, intensity, and timing

### *Runoff Prevention & Mitigation*

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- Runoff survey
- Insecticide selection
- Application
- Containment
- Water recovery
- Buffer strip

### *Runoff Site Survey*

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- Terrain, water flow
  - proximity to water bodies
- Storage area
- Mixing & loading area
- Wash area
- Application site

### *Insecticide Selection*

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- Efficacy
- Formulation
- Physico-chemical properties
- Dose (use rate)
- Aquatic toxicity

### *Application*

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- Label
  - environmental hazards
  - use directions
- Rate
- Timing
  - rain & irrigation
- Precision application
  - calibration

### *Label: Environmental Hazards*

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This pesticide is extremely toxic to fish and aquatic invertebrates.

Do not apply directly to water.

Drift and run-off from treated areas may be hazardous to aquatic organisms in neighboring areas.

Do not contaminate water when disposing of equipment washwaters.

### *Label Recommendation*

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“Do not apply if rain is expected within 12 hours”



### *Containment*

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- Rain shelter
- Containment of spills
  - storage area, mixing loading, wash pad
- Rinsate reuse, treatment
- Containment of runoff water

### *Water Recovery*

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- Re-circulating system
- Tailwater recovery
  - phytotoxicity (herbicide residues)
  - microbial degradation, photodegradation
  - hydrolysis

### *Buffer Strips*

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- Water soluble vs. adsorped
- Buffer area
- Vegetation strip
  - natural, grasses, cover crops
- Organic material strip

### *Summary*

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- Do Precision Application
- Timing of application to prevent rain washoff
- Control timing and amount of watering to prevent runoff
- Containment of runoff water
- Recapture tailwater and reuse of water
- Use buffer strips

## *Acknowledgment*

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- Calif. Dept. of Food & Agric.
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- State Water Resource Control Board
- Santa Ana RWQCB
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- Calif. Department of Fish & Game
- Co. Agric. Commissioners
- UC Cooperative Extension
- Plant Nursery Industry